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PATENT & TRADEMARK OFFICE

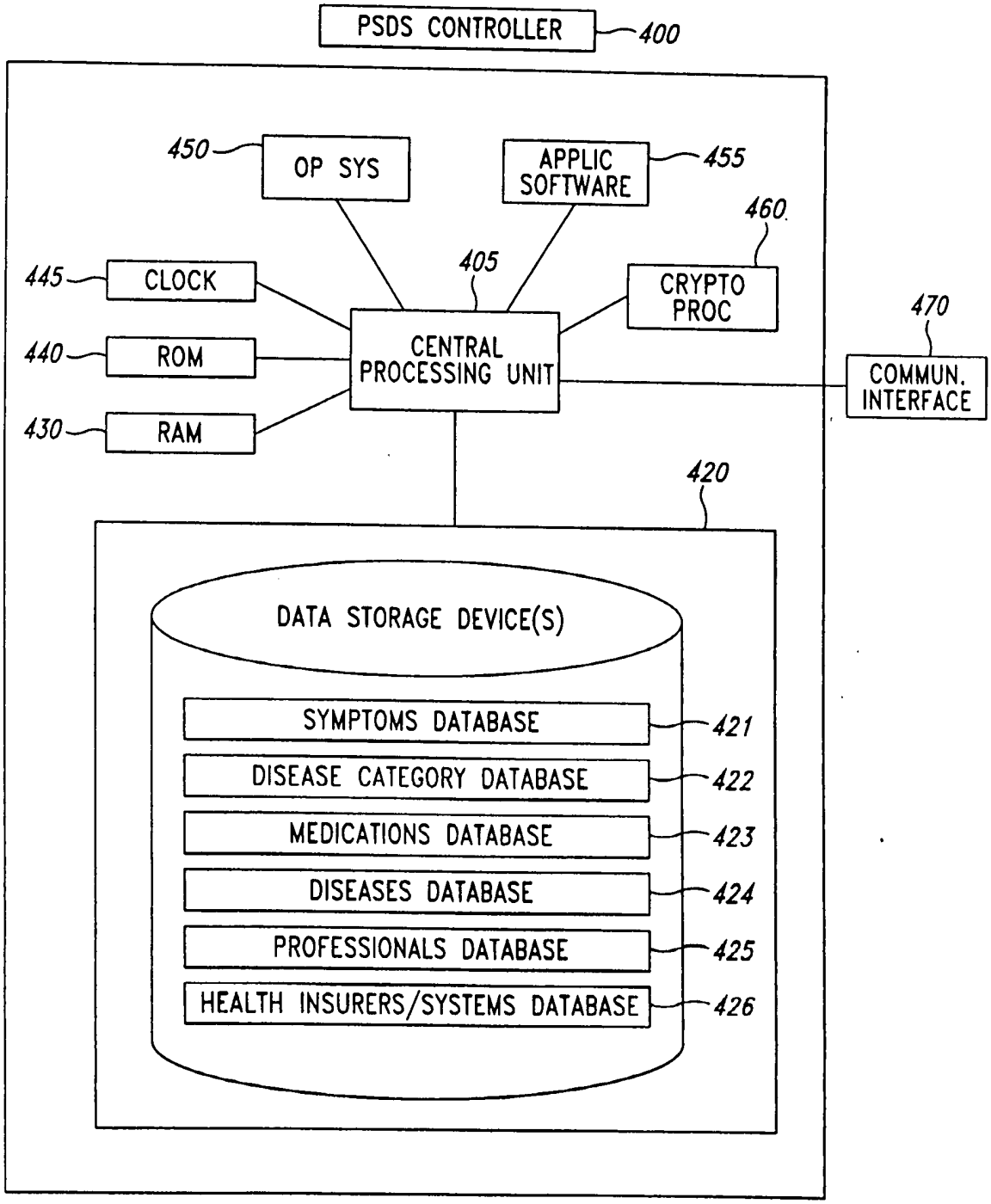

Fig. 1

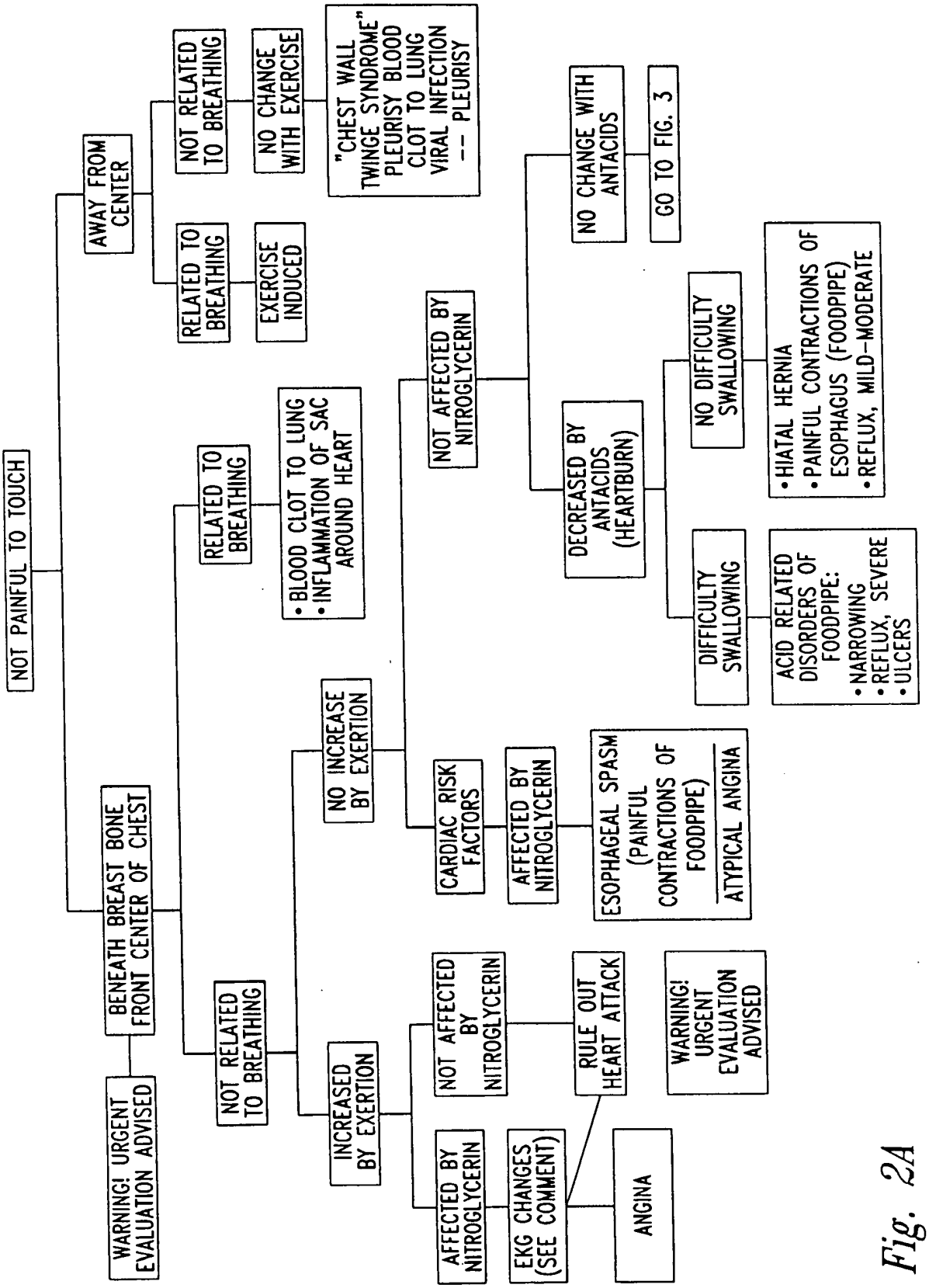
NOT PAINFUL TO TOUCH
BENEATH BREAST BONE FRONT CENTER OF CHEST
WARNING! URGENT EVALUATION ADVISED
AWAY FROM CENTER
NOT RELATED TO BREATHING
NO CHANGE WITH EXERCISE
"CHEST WALL TWINGE SYNDROME" PLEURISY BLOOD CLOT TO LUNG VIRAL INFECTION -- PLEURISY
RELATED TO BREATHING
EXERCISE INDUCED
NOT RELATED TO BREATHING
RELATED TO BREATHING
• BLOOD CLOT TO LUNG
• INFLAMMATION OF SAC AROUND HEART
INCREASED BY EXERTION
NO INCREASE BY EXERTION
NOT AFFECTED BY NITROGLYCERIN
NO CHANGE WITH ANTACIDS
GO TO FIG. 3
DECREASED BY ANTACIDS (HEARTBURN)
NO DIFFICULTY SWALLOWING
• HIATAL HERNIA
• PAINFUL CONTRACTIONS OF ESOPHAGUS (FOODPIPE)
• REFLUX, MILD-MODERATE
DIFFICULTY SWALLOWING
ACID RELATED DISORDERS OF FOODPIPE:
• NARROWING
• REFLUX, SEVERE
• ULCERS
CARDIAC RISK FACTORS
AFFECTED BY NITROGLYCERIN
ESOPHAGEAL SPASM (PAINFUL CONTRACTIONS OF FOODPIPE)
ATYPICAL ANGINA
NOT AFFECTED BY NITROGLYCERIN
RULE OUT HEART ATTACK
WARNING! URGENT EVALUATION ADVISED
AFFECTED BY NITROGLYCERIN
EKG CHANGES (SEE COMMENT)
ANGINA

Fig. 2A

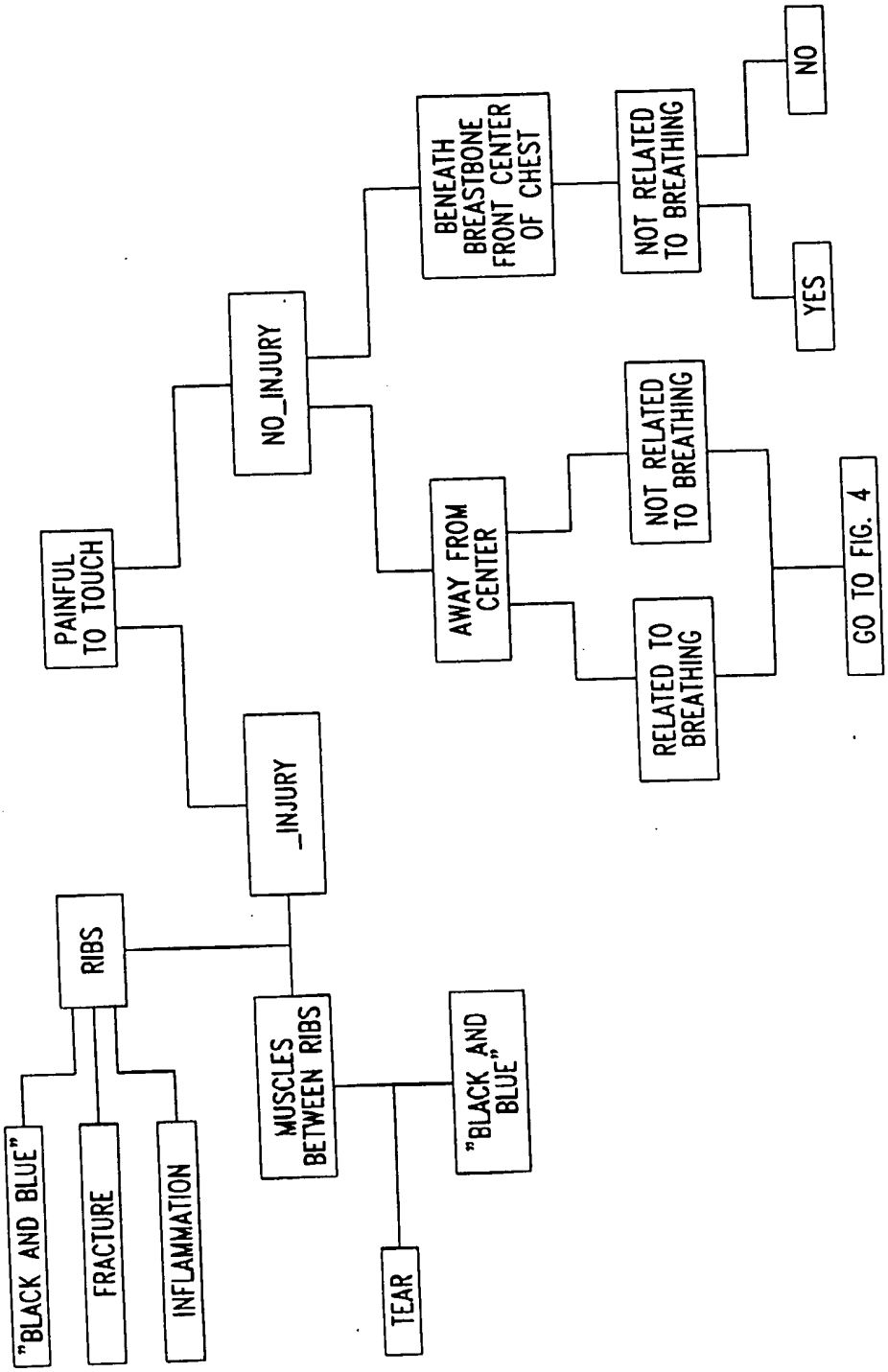
PAINFUL TO TOUCH
_INJURY
RIBS
"BLACK AND BLUE"
FRACTURE
INFLAMMATION
MUSCLES BETWEEN RIBS
TEAR
"BLACK AND BLUE"
NO_INJURY
AWAY FROM CENTER
RELATED TO BREATHING
NOT RELATED TO BREATHING
GO TO FIG. 4
BENEATH BREASTBONE FRONT CENTER OF CHEST
NOT RELATED TO BREATHING
YES
NO

Fig. 2B

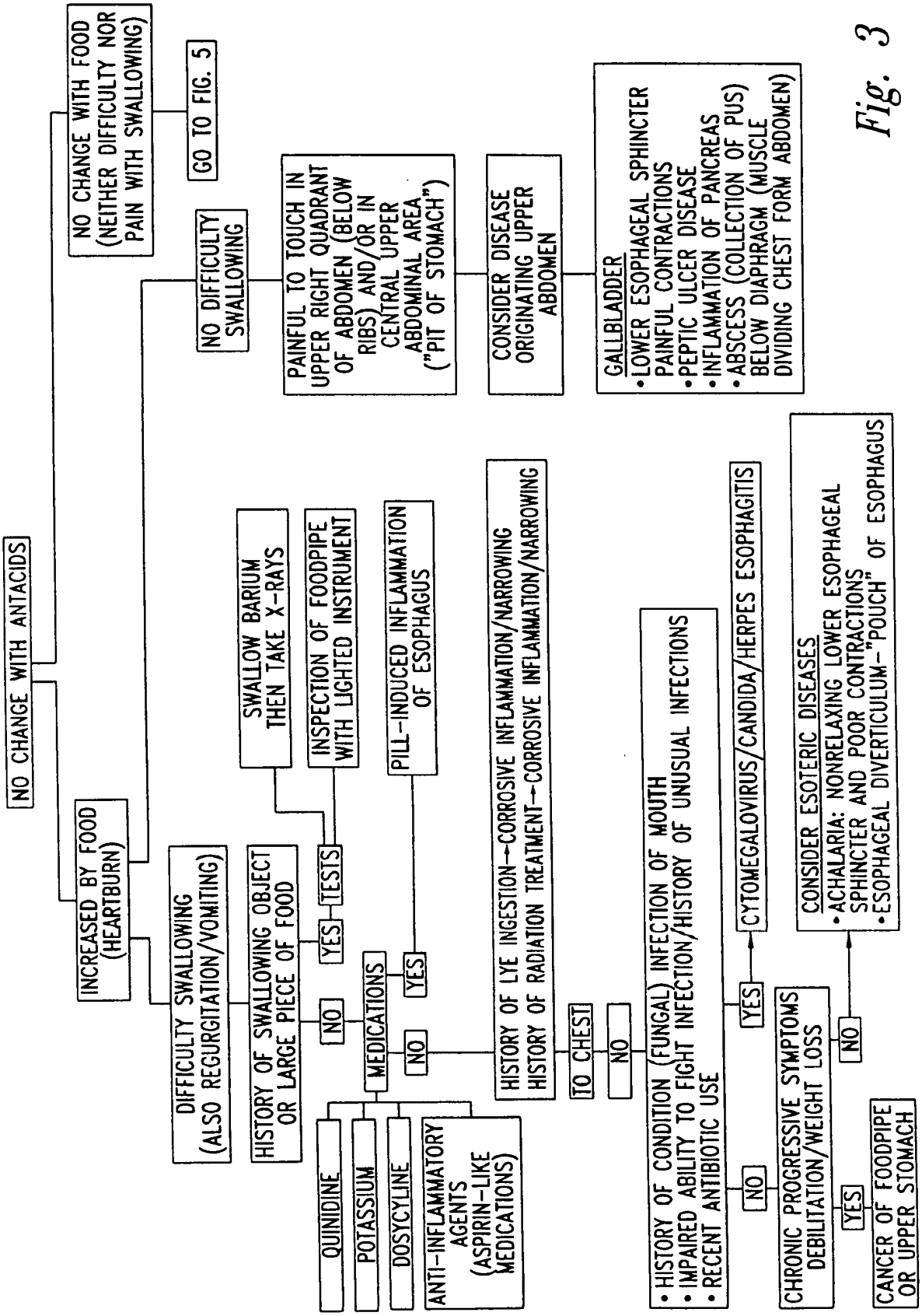
NO CHANGE WITH ANTACIDS
INCREASED BY FOOD (HEARTBURN)
NO CHANGE WITH FOOD (NEITHER DIFFICULTY NOR PAIN WITH SWALLOWING)
GO TO FIG. 5
DIFFICULTY SWALLOWING (ALSO REGURGITATION/VOMITING)
NO DIFFICULTY SWALLOWING
PAINFUL TO TOUCH IN UPPER RIGHT QUADRANT OF ABDOMEN (BELOW RIBS) AND/OR IN CENTRAL UPPER ABDOMINAL AREA ("PIT OF STOMACH")
CONSIDER DISEASE ORIGINATING UPPER ABDOMEN
GALLBLADDER
•LOWER ESOPHAGEAL SPHINCTER PAINFUL CONTRACTIONS
•PEPTIC ULCER DISEASE
•INFLAMMATION OF PANCREAS
•ABSCESS (COLLECTION OF PUS) BELOW DIAPHRAGM (MUSCLE DIVIDING CHEST FORM ABDOMEN)
HISTORY OF SWALLOWING OBJECT OR LARGE PIECE OF FOOD
NO
YES
TESTS
SWALLOW BARIUM THEN TAKE X-RAYS
INSPECTION OF FOODPIPE WITH LIGHTED INSTRUMENT
MEDICATIONS
NO
YES
PILL-INDUCED INFLAMMATION OF ESOPHAGUS
QUINIDINE
POTASSIUM
DOSYCYLINE
ANTI-INFLAMMATORY AGENTS (ASPIRIN-LIKE MEDICATIONS)
HISTORY OF LYE INGESTION→CORROSIVE INFLAMMATION/NARROWING
HISTORY OF RADIATION TREATMENT→CORROSIVE INFLAMMATION/NARROWING
TO CHEST
NO
•HISTORY OF CONDITION (FUNGAL) INFECTION OF MOUTH
•IMPAIRED ABILITY TO FIGHT INFECTION/HISTORY OF UNUSUAL INFECTIONS
•RECENT ANTIBIOTIC USE
NO
YES
CYTOMEGALOVIRUS/CANDIDA/HERPES ESOPHAGITIS
CHRONIC PROGRESSIVE SYMPTOMS DEBILITATION/WEIGHT LOSS
YES
CANCER OF FOODPIPE OR UPPER STOMACH
NO
CONSIDER ESOTERIC DISEASES
•ACHALARIA: NONRELAXING LOWER ESOPHAGEAL SPHINCTER AND POOR CONTRACTIONS
•ESOPHAGEAL DIVERTICULUM-"POUCH" OF ESOPHAGUS

Fig. 3

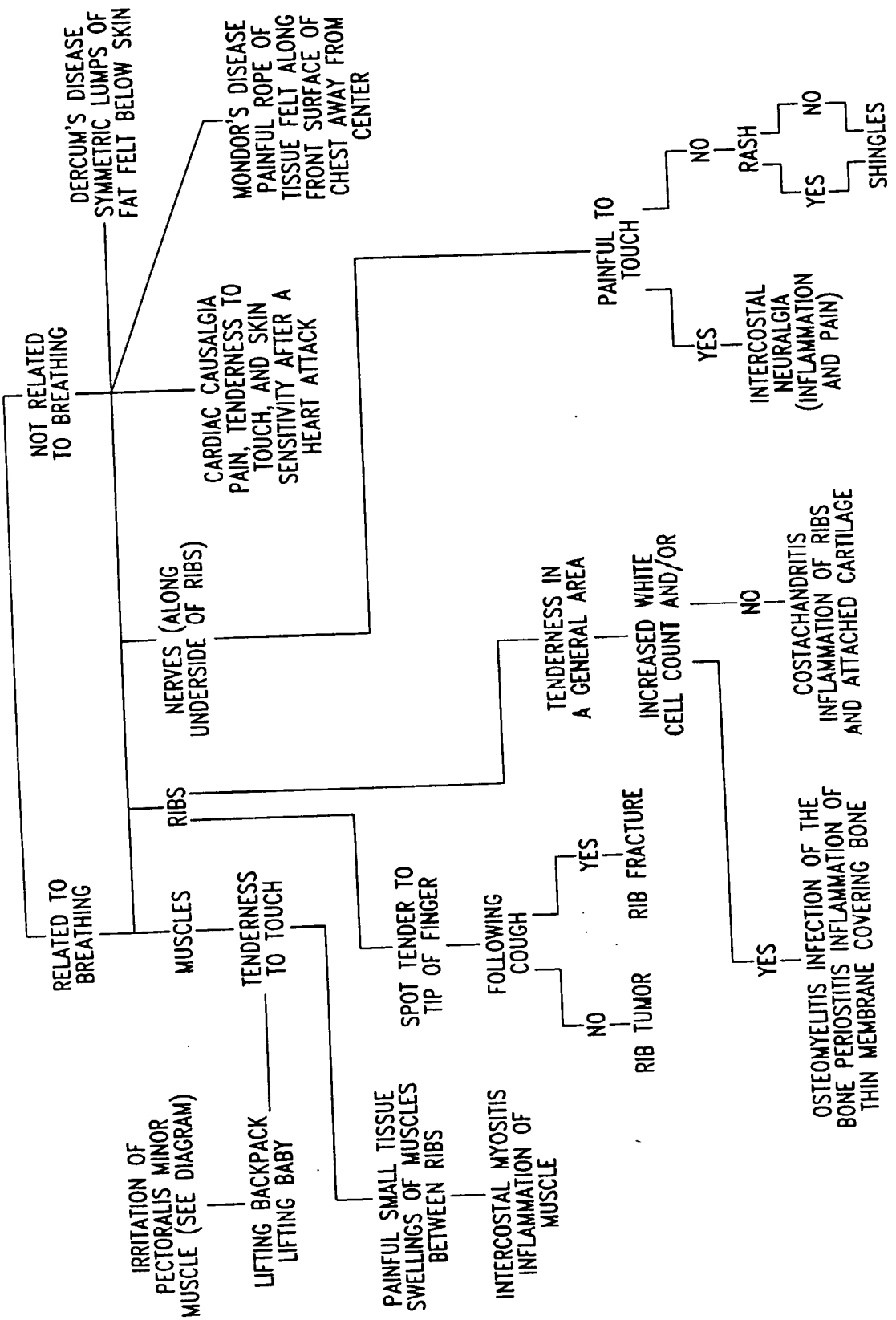
RELATED TO BREATHING
NOT RELATED TO BREATHING
DERCUM'S DISEASE SYMMETRIC LUMPS OF FAT FELT BELOW SKIN
MONDOR'S DISEASE PAINFUL ROPE OF TISSUE FELT ALONG FRONT SURFACE OF CHEST AWAY FROM CENTER
CARDIAC CAUSALGIA PAIN, TENDERNESS TO TOUCH, AND SKIN SENSITIVITY AFTER A HEART ATTACK
NERVES (ALONG UNDERSIDE OF RIBS)
PAINFUL TO TOUCH
NO
RASH
NO
YES
SHINGLES
YES
INTERCOSTAL NEURALGIA (INFLAMMATION AND PAIN)
RIBS
TENDERNESS IN A GENERAL AREA
INCREASED WHITE CELL COUNT AND/OR
NO
COSTACHANDRITIS INFLAMMATION OF RIBS AND ATTACHED CARTILAGE
YES
OSTEOMYELITIS INFECTION OF THE BONE PERIOSTITIS INFLAMMATION OF THIN MEMBRANE COVERING BONE
MUSCLES
TENDERNESS TO TOUCH
IRRITATION OF PECTORALIS MINOR MUSCLE (SEE DIAGRAM)
LIFTING BACKPACK LIFTING BABY
SPOT TENDER TO TIP OF FINGER
PAINFUL SMALL TISSUE SWELLINGS OF MUSCLES BETWEEN RIBS
FOLLOWING COUGH
YES
RIB FRACTURE
NO
RIB TUMOR
INTERCOSTAL MYOSITIS INFLAMMATION OF MUSCLE

Fig. 4

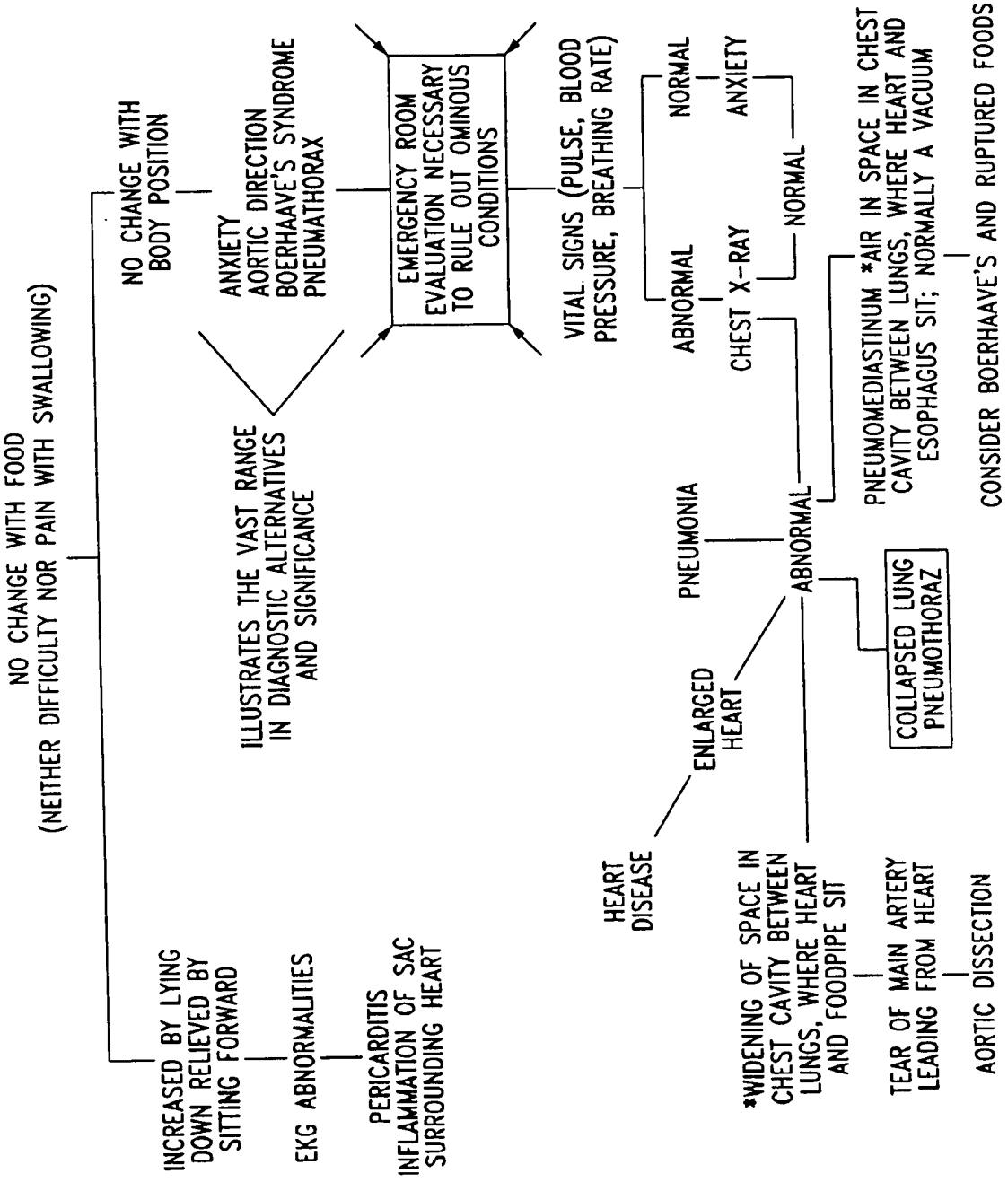
NO CHANGE WITH FOOD
(NEITHER DIFFICULTY NOR PAIN WITH SWALLOWING)
NO CHANGE WITH BODY POSITION
INCREASED BY LYING DOWN RELIEVED BY SITTING FORWARD
EKG ABNORMALITIES
PERICARDITIS INFLAMMATION OF SAC SURROUNDING HEART
ILLUSTRATES THE VAST RANGE IN DIAGNOSTIC ALTERNATIVES AND SIGNIFICANCE
ANXIETY
AORTIC DIRECTION
BOERHAAVE'S SYNDROME
PNEUMATHORAX
EMERGENCY ROOM EVALUATION NECESSARY TO RULE OUT OMINOUS CONDITIONS
VITAL SIGNS (PULSE, BLOOD PRESSURE, BREATHING RATE)
ABNORMAL
NORMAL
CHEST X-RAY
ANXIETY
NORMAL
ABNORMAL
PNEUMONIA
ENLARGED HEART
HEART DISEASE
*WIDENING OF SPACE IN CHEST CAVITY BETWEEN LUNGS, WHERE HEART AND FOODPIPE SIT
TEAR OF MAIN ARTERY LEADING FROM HEART
AORTIC DISSECTION
COLLAPSED LUNG PNEUMOTHORAZ
PNEUMOMEDIASTINUM *AIR IN SPACE IN CHEST CAVITY BETWEEN LUNGS, WHERE HEART AND ESOPHAGUS SIT; NORMALLY A VACUUM
CONSIDER BOERHAAVE'S AND RUPTURED FOODS

Fig. 5

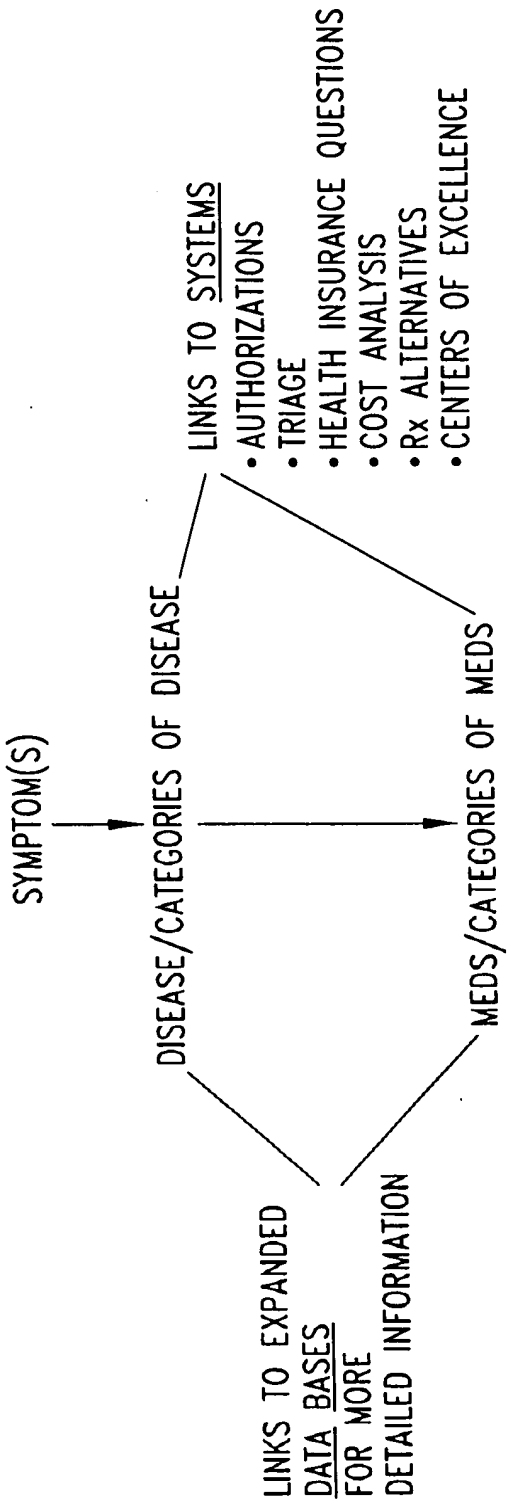
SYMPTOM(S)
DISEASE/CATEGORIES OF DISEASE
MEDS/CATEGORIES OF MEDS
LINKS TO SYSTEMS
•AUTHORIZATIONS
•TRIAGE
•HEALTH INSURANCE QUESTIONS
•COST ANALYSIS
•Rx ALTERNATIVES
•CENTERS OF EXCELLENCE
LINKS TO EXPANDED DATA BASES FOR MORE DETAILED INFORMATION

Fig. 6

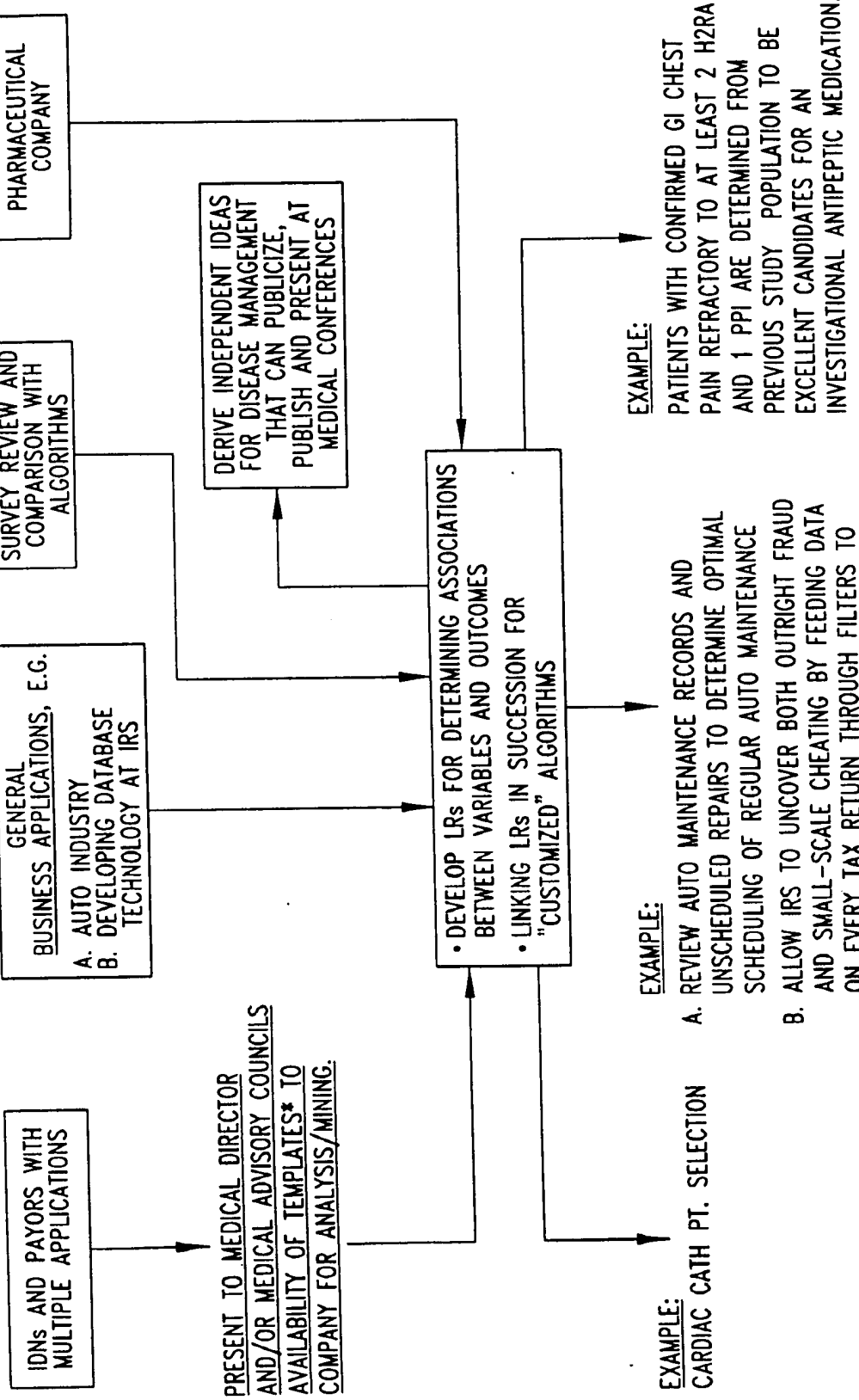
PHARMACEUTICAL COMPANY
SURVEY REVIEW AND COMPARISON WITH ALGORITHMS
DERIVE INDEPENDENT IDEAS FOR DISEASE MANAGEMENT THAT CAN PUBLICIZE, PUBLISH AND PRESENT AT MEDICAL CONFERENCES
GENERAL BUSINESS APPLICATIONS, E.G.
A. AUTO INDUSTRY
B. DEVELOPING DATABASE TECHNOLOGY AT IRS
• DEVELOP LRs FOR DETERMINING ASSOCIATIONS BETWEEN VARIABLES AND OUTCOMES
• LINKING LRs IN SUCCESSION FOR "CUSTOMIZED" ALGORITHMS
EXAMPLE:
PATIENTS WITH CONFIRMED GI CHEST PAIN REFRACTORY TO AT LEAST 2 H2RA AND 1 PPI ARE DETERMINED FROM PREVIOUS STUDY POPULATION TO BE EXCELLENT CANDIDATES FOR AN INVESTIGATIONAL ANTIPEPTIC MEDICATION.
EXAMPLE:
A. REVIEW AUTO MAINTENANCE RECORDS AND UNSCHEDULED REPAIRS TO DETERMINE OPTIMAL SCHEDULING OF REGULAR AUTO MAINTENANCE
B. ALLOW IRS TO UNCOVER BOTH OUTRIGHT FRAUD AND SMALL-SCALE CHEATING BY FEEDING DATA ON EVERY TAX RETURN THROUGH FILTERS TO IDENTIFY PATTERNS OF TAXPAYER CONDUCT.
IDNs AND PAYORS WITH MULTIPLE APPLICATIONS
PRESENT TO MEDICAL DIRECTOR AND/OR MEDICAL ADVISORY COUNCILS AVAILABILITY OF TEMPLATES* TO COMPANY FOR ANALYSIS/MINING.
EXAMPLE:
CARDIAC CATH PT. SELECTION

Fig. 7

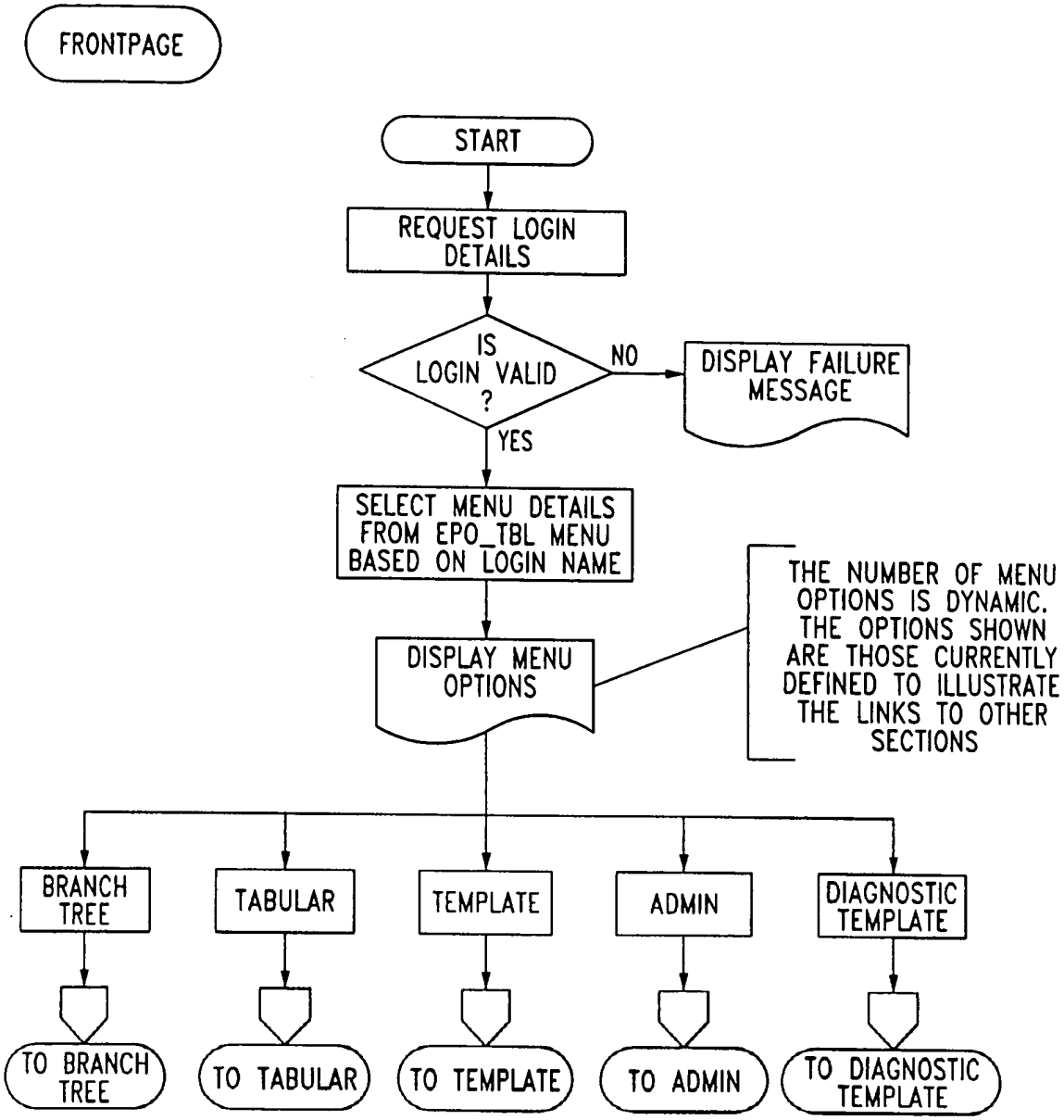
FRONTPAGE
START
REQUEST LOGIN DETAILS
IS LOGIN VALID ?
NO
DISPLAY FAILURE MESSAGE
YES
SELECT MENU DETAILS FROM EPO_TBL MENU BASED ON LOGIN NAME
DISPLAY MENU OPTIONS
THE NUMBER OF MENU OPTIONS IS DYNAMIC. THE OPTIONS SHOWN ARE THOSE CURRENTLY DEFINED TO ILLUSTRATE THE LINKS TO OTHER SECTIONS
BRANCH TREE
TABULAR
TEMPLATE
ADMIN
DIAGNOSTIC TEMPLATE
TO BRANCH TREE
TO TABULAR
TO TEMPLATE
TO ADMIN
TO DIAGNOSTIC TEMPLATE

Fig. 8

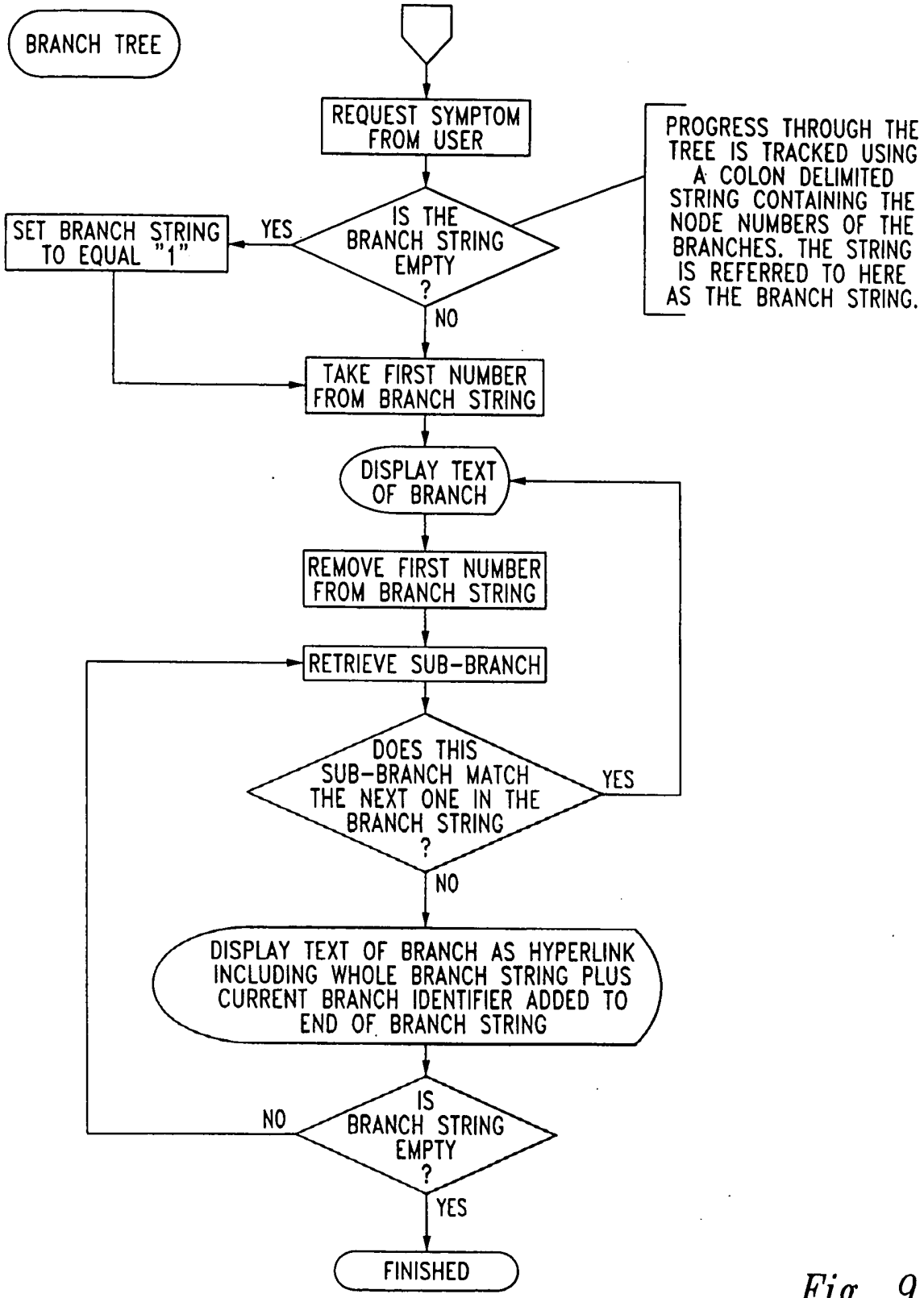
BRANCH TREE
REQUEST SYMPTOM FROM USER
IS THE BRANCH STRING EMPTY ?
YES
SET BRANCH STRING TO EQUAL "1"
NO
PROGRESS THROUGH THE TREE IS TRACKED USING A COLON DELIMITED STRING CONTAINING THE NODE NUMBERS OF THE BRANCHES. THE STRING IS REFERRED TO HERE AS THE BRANCH STRING.
TAKE FIRST NUMBER FROM BRANCH STRING
DISPLAY TEXT OF BRANCH
REMOVE FIRST NUMBER FROM BRANCH STRING
RETRIEVE SUB-BRANCH
DOES THIS SUB-BRANCH MATCH THE NEXT ONE IN THE BRANCH STRING ?
YES
NO
DISPLAY TEXT OF BRANCH AS HYPERLINK INCLUDING WHOLE BRANCH STRING PLUS CURRENT BRANCH IDENTIFIER ADDED TO END OF BRANCH STRING
IS BRANCH STRING EMPTY ?
NO
YES
FINISHED

Fig. 9

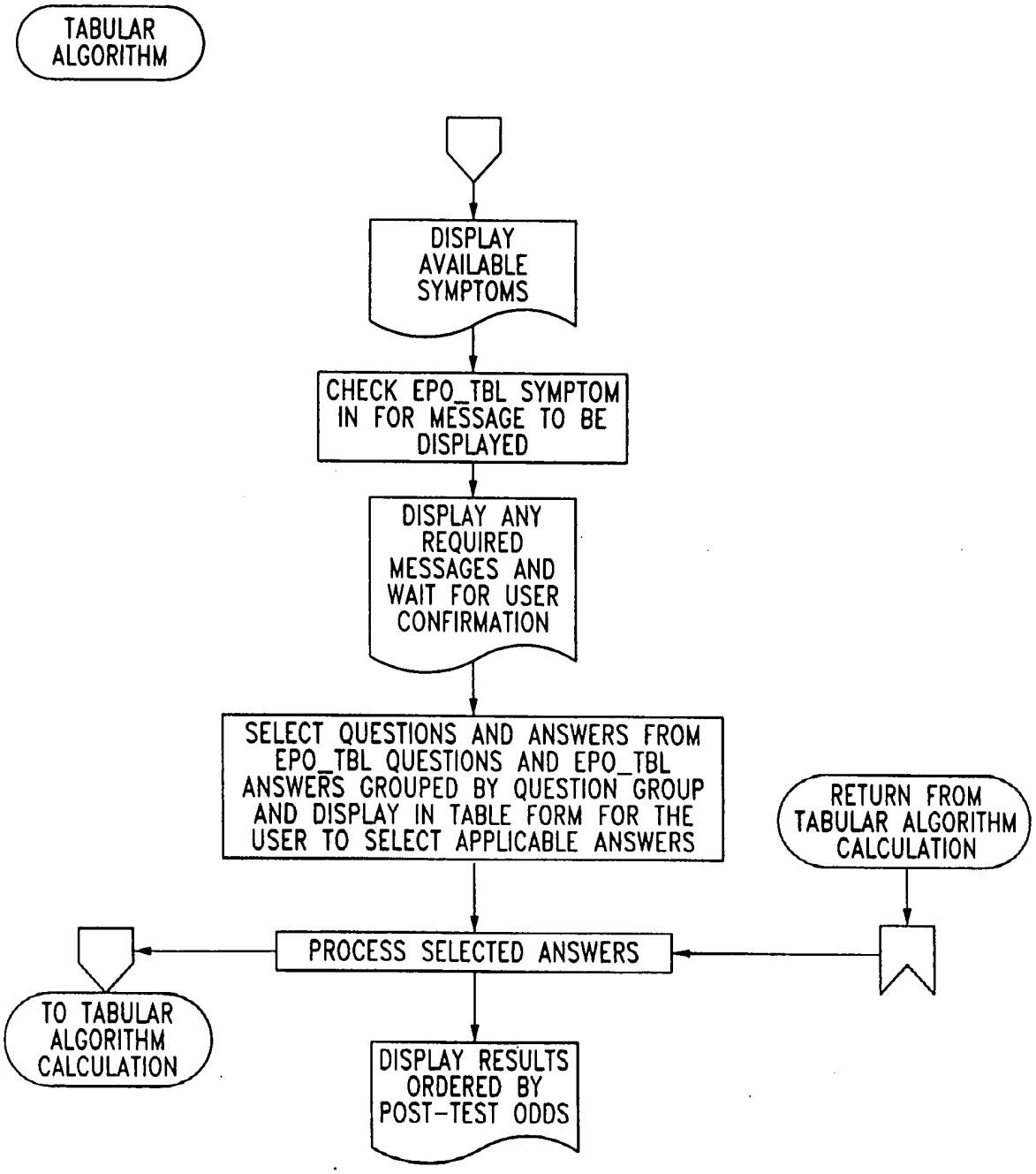
TABULAR ALGORITHM
DISPLAY AVAILABLE SYMPTOMS
CHECK EPO_TBL SYMPTOM IN FOR MESSAGE TO BE DISPLAYED
DISPLAY ANY REQUIRED MESSAGES AND WAIT FOR USER CONFIRMATION
SELECT QUESTIONS AND ANSWERS FROM EPO_TBL QUESTIONS AND EPO_TBL ANSWERS GROUPED BY QUESTION GROUP AND DISPLAY IN TABLE FORM FOR THE USER TO SELECT APPLICABLE ANSWERS
RETURN FROM TABULAR ALGORITHM CALCULATION
PROCESS SELECTED ANSWERS
TO TABULAR ALGORITHM CALCULATION
DISPLAY RESULTS ORDERED BY POST-TEST ODDS

Fig. 10

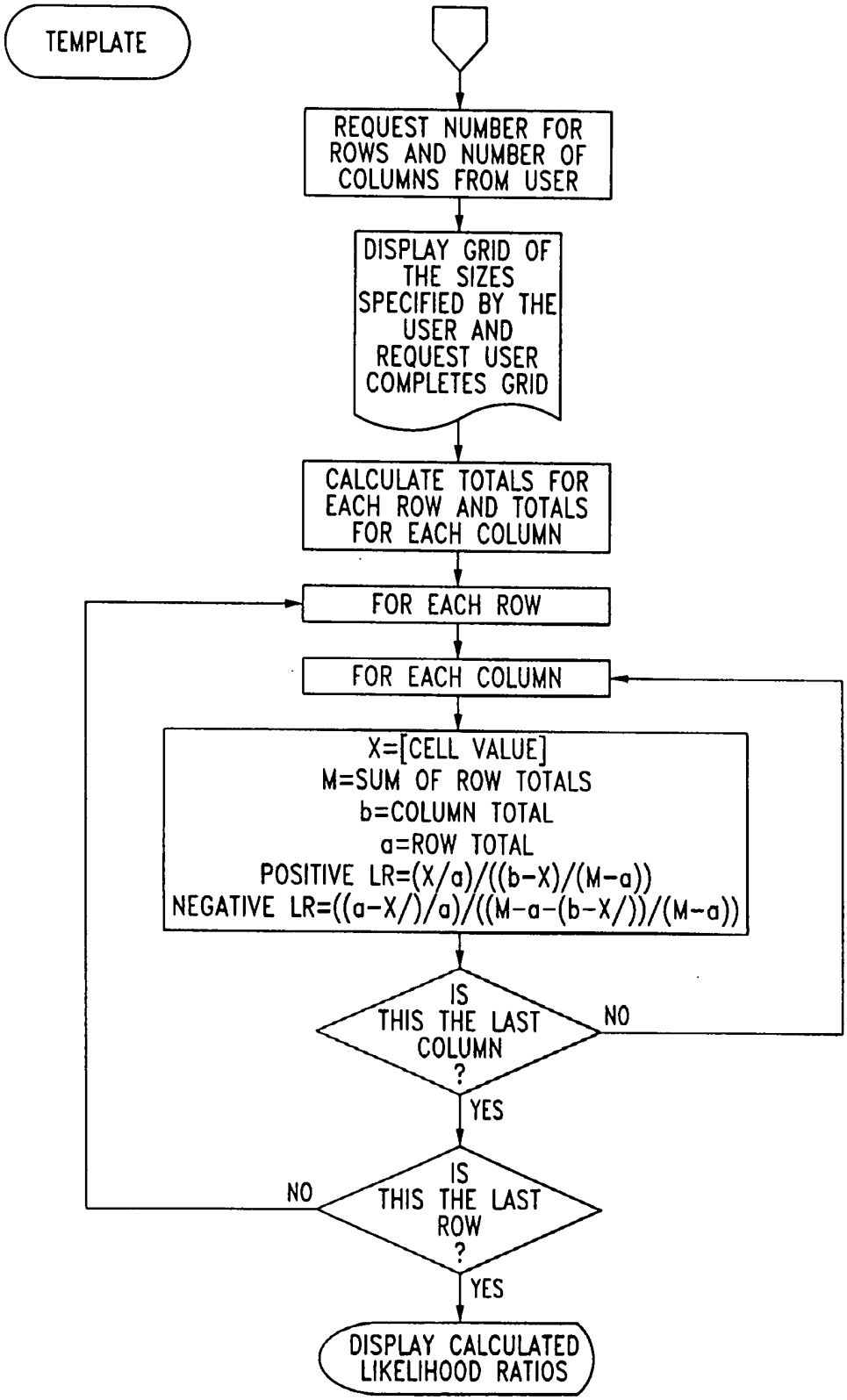
TEMPLATE
REQUEST NUMBER FOR ROWS AND NUMBER OF COLUMNS FROM USER
DISPLAY GRID OF THE SIZES SPECIFIED BY THE USER AND REQUEST USER COMPLETES GRID
CALCULATE TOTALS FOR EACH ROW AND TOTALS FOR EACH COLUMN
FOR EACH ROW
FOR EACH COLUMN
X=[CELL VALUE]
M=SUM OF ROW TOTALS
b=COLUMN TOTAL
a=ROW TOTAL
POSITIVE LR=(X/a)/((b-X)/(M-a))
NEGATIVE LR=((a-X/)/a)/((M-a-(b-X/))/(M-a))
IS THIS THE LAST COLUMN ?
NO
YES
IS THIS THE LAST ROW ?
NO
YES
DISPLAY CALCULATED LIKELIHOOD RATIOS

Fig. 11

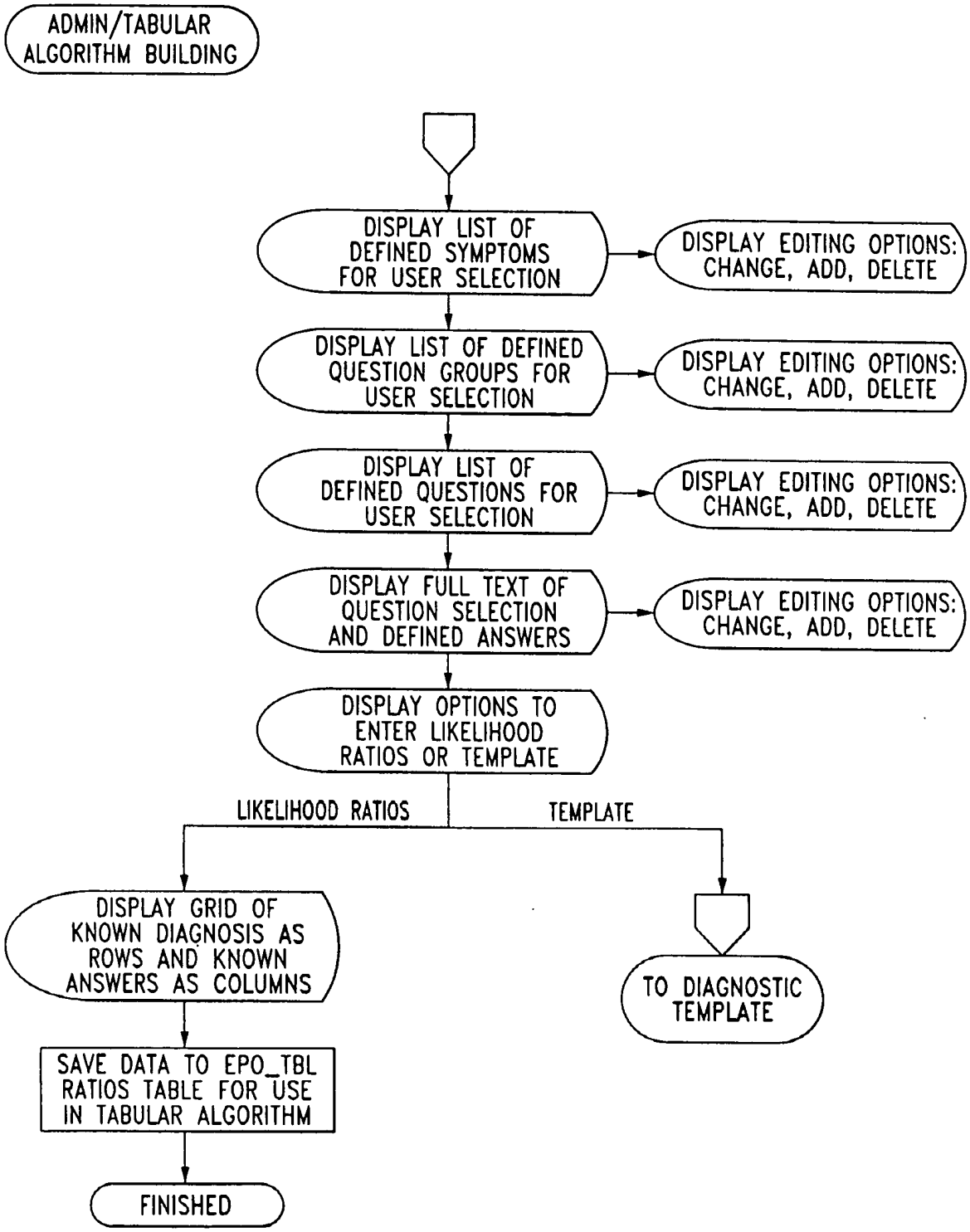
ADMIN/TABULAR ALGORITHM BUILDING
DISPLAY LIST OF DEFINED SYMPTOMS FOR USER SELECTION
DISPLAY EDITING OPTIONS: CHANGE, ADD, DELETE
DISPLAY LIST OF DEFINED QUESTION GROUPS FOR USER SELECTION
DISPLAY EDITING OPTIONS: CHANGE, ADD, DELETE
DISPLAY LIST OF DEFINED QUESTIONS FOR USER SELECTION
DISPLAY EDITING OPTIONS: CHANGE, ADD, DELETE
DISPLAY FULL TEXT OF QUESTION SELECTION AND DEFINED ANSWERS
DISPLAY EDITING OPTIONS: CHANGE, ADD, DELETE
DISPLAY OPTIONS TO ENTER LIKELIHOOD RATIOS OR TEMPLATE
LIKELIHOOD RATIOS
TEMPLATE
DISPLAY GRID OF KNOWN DIAGNOSIS AS ROWS AND KNOWN ANSWERS AS COLUMNS
SAVE DATA TO EPO_TBL RATIOS TABLE FOR USE IN TABULAR ALGORITHM
FINISHED
TO DIAGNOSTIC TEMPLATE

Fig. 12

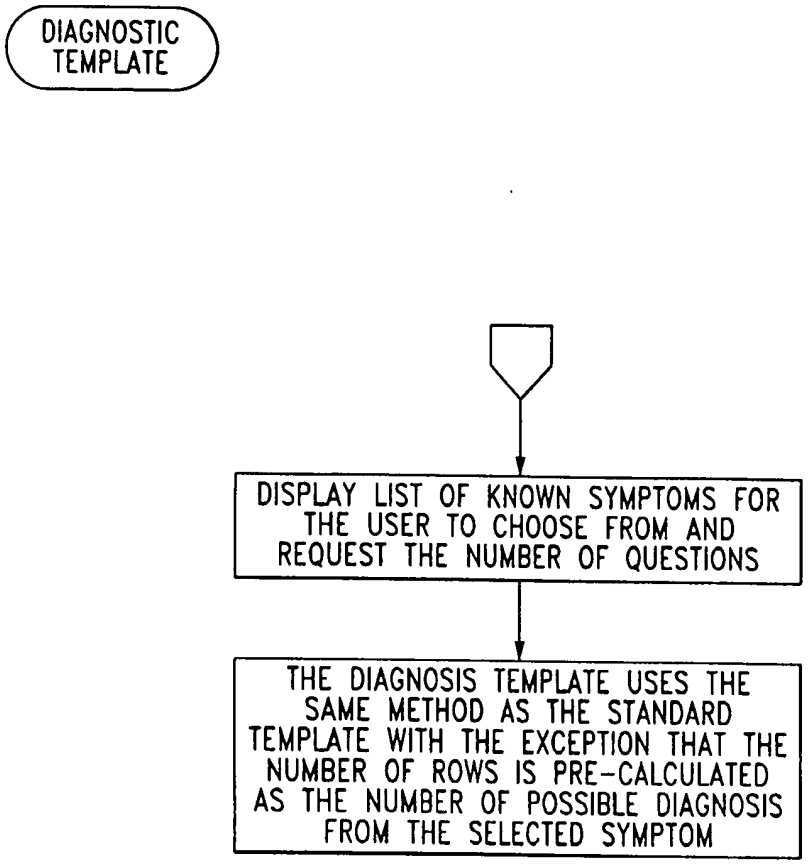
DIAGNOSTIC TEMPLATE
DISPLAY LIST OF KNOWN SYMPTOMS FOR THE USER TO CHOOSE FROM AND REQUEST THE NUMBER OF QUESTIONS
THE DIAGNOSIS TEMPLATE USES THE SAME METHOD AS THE STANDARD TEMPLATE WITH THE EXCEPTION THAT THE NUMBER OF ROWS IS PRE-CALCULATED AS THE NUMBER OF POSSIBLE DIAGNOSIS FROM THE SELECTED SYMPTOM

Fig. 13

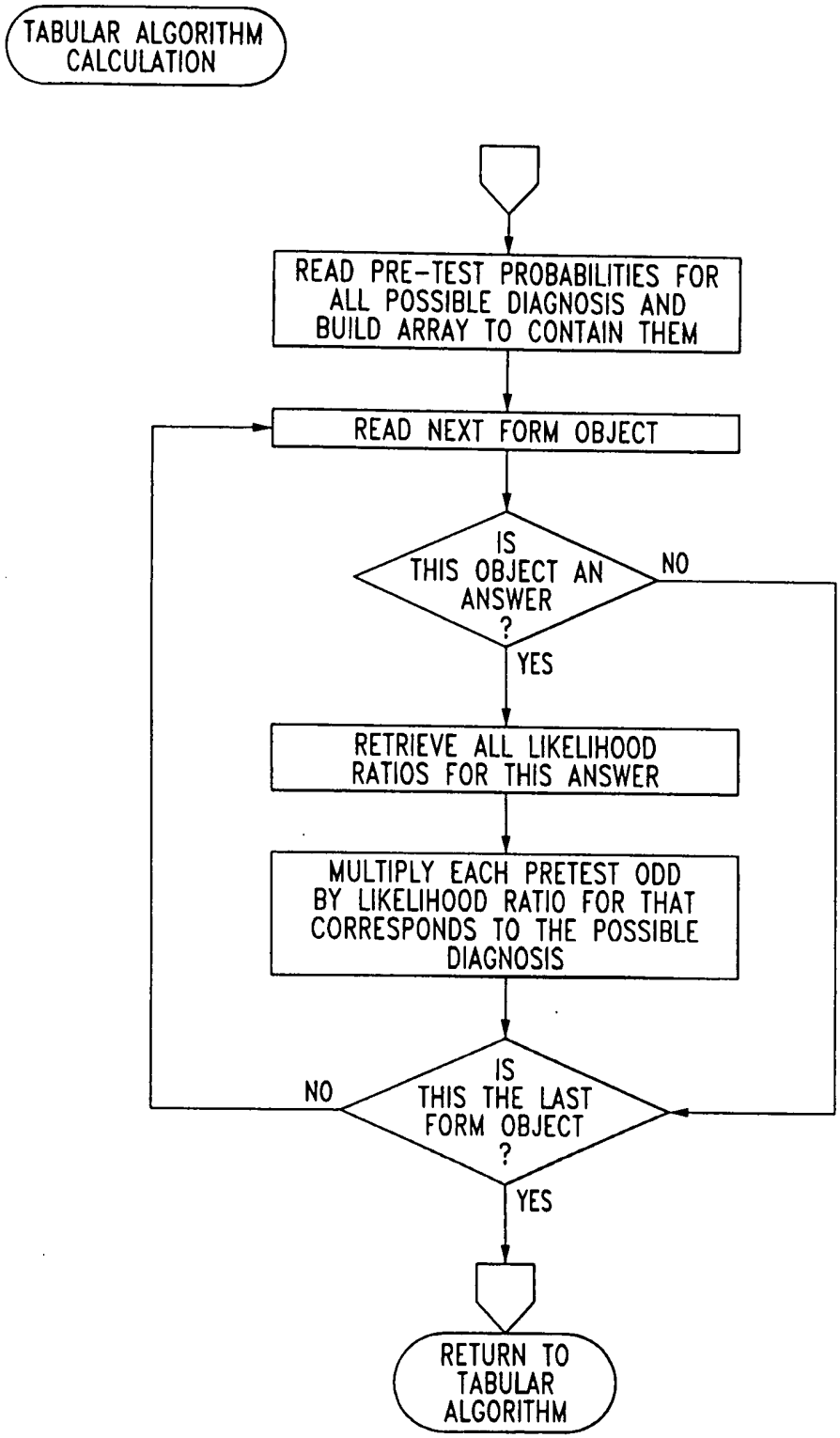
TABULAR ALGORITHM CALCULATION
READ PRE-TEST PROBABILITIES FOR ALL POSSIBLE DIAGNOSIS AND BUILD ARRAY TO CONTAIN THEM
READ NEXT FORM OBJECT
IS THIS OBJECT AN ANSWER ?
NO
YES
RETRIEVE ALL LIKELIHOOD RATIOS FOR THIS ANSWER
MULTIPLY EACH PRETEST ODD BY LIKELIHOOD RATIO FOR THAT CORRESPONDS TO THE POSSIBLE DIAGNOSIS
IS THIS THE LAST FORM OBJECT ?
NO
YES
RETURN TO TABULAR ALGORITHM

Fig. 14